

FERMILAB SAFETY NOTE 18

Tantalum Capacitor Failures

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Fermilab Electrical Safety Subcommittee

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The Mallory 33uf 50WVDC wet slug tantalum capacitor, Mallory PN MTP-336M050P1B and Fermilab stock #1425-1300, is in relatively wide use at the Laboratory. Over the last year or so, these capacitors have started to show a consistent pattern of catastrophic short-circuit failure. Such failures are due to either electrolyte migration past the inner seal to the cathodic case, or to the drying up of the electrolyte, which, when coupled with the interior design of the this particular part, yields the same catastrophic result.

The capacitors which failed have typically been in service for at least five years, and represent a very small percentage of installed parts. Given the type and design of these capacitors, these failures are to be expected over time.

The short-circuit failure mode of these capacitors can lead to localized heating if the supply current is not limited or interrupted. Such heating, if prolonged, can lead to significant damage of printed circuit board epoxy filler and/or of associated circuitry. The presence of low-temperature ignitable fuel in such a situation could present a definite fire hazard.

These capacitors are no longer available from stock. A 25uf 50WVDC capacitor (#1425-1325) and a 40uf 30WVDC capacitor (#1425-1350) have been added to stock as replacements. Their cost is slightly more expensive at about \$2.30 each. They will be available from stores on or about March 25, 1991. These new capacitors, which are almost identical in physical size, are of different manufacture and are not expected to short-circuit fail. Additionally, a 100uf 30WVDC capacitor (#1425-1375) of the same series is also being added to stores. This part is, however, physically larger than either the 25uf or 40uf parts.

Users of the 33uf part are urged to take the following precautionary steps. Special priority should be given to examination of circuits that have made use of this part that have been in service for more than five years.

1: Examine all such parts in service for signs of encroaching failure. Such signs include discoloration and/or the presence of a darkened ring between the red epoxy end and capacitor body. If such signs are found, replace the part immediately.

2: Review power supply distribution for circuits containing these capacitors. Determine if current to such capacitors is safely limited. If appropriate, install overcurrent protection (typically fuses) or replace the part.

3: Discard the 33uf or similar parts which may be in local part stores under your control. There will NOT be a stockroom exchange program. The requisitioner will be expected to bear the replacement costs.

Distribution

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